



ULTRA-HIGH-SPEED, HIGH-PRECISION VERTICAL
MACHINING CENTER EQUIPPED WITH LINEAR MOTORS

FM

200/5AX

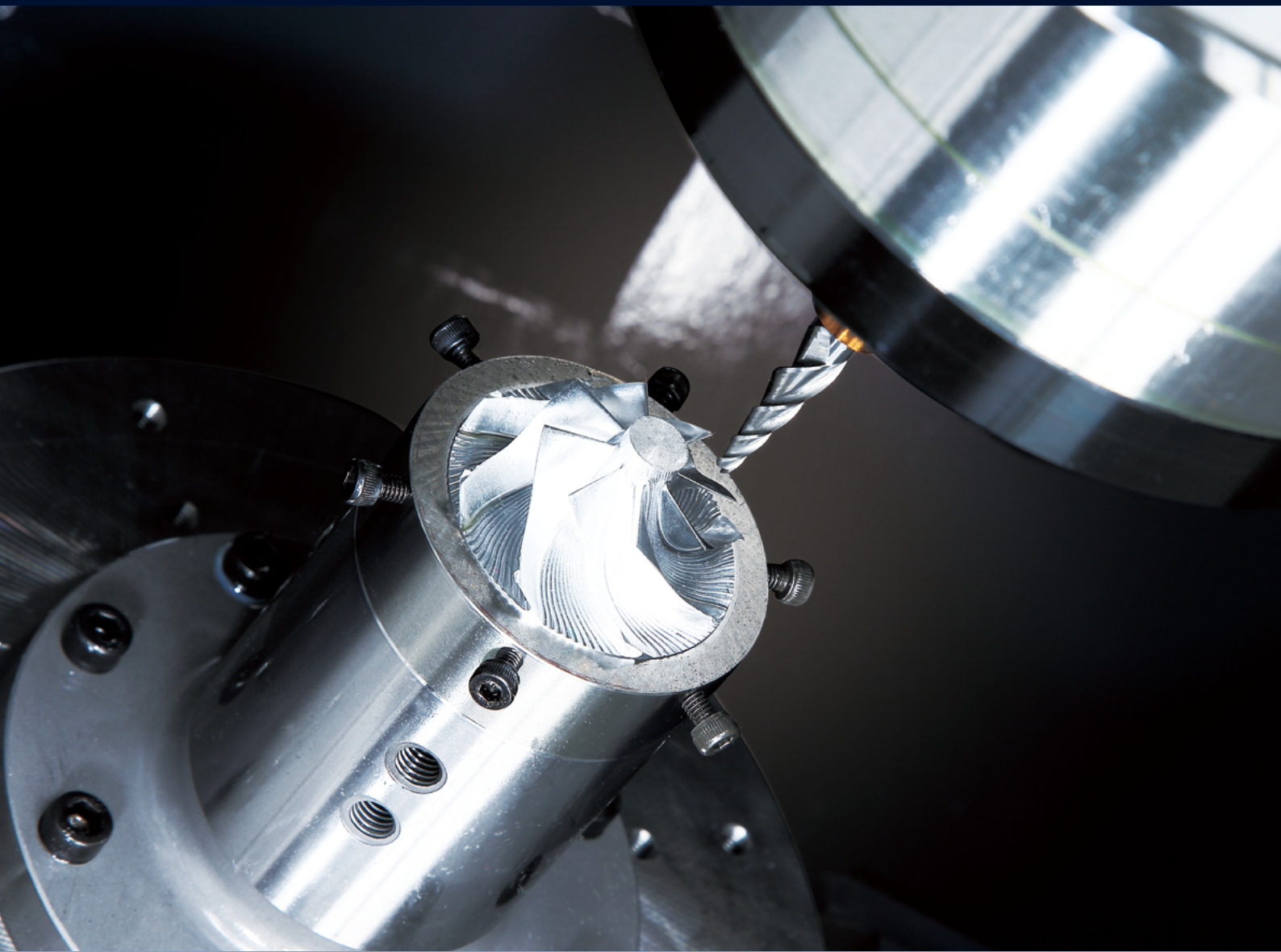


DN SOLUTIONS

FM 200/5AX

The FM 200/5AX offers super-fast traveling and great reliability with its high-speed spindle and linear axes driven by linear motors, in addition to excellent stability in cutting operation due to the adoption of anti-vibration materials.





STABLE BED AND STRUCTURE DESIGN

Stable cutting based on anti-vibration materials and symmetrical gantry structure.

STABLE CUTTING BASED ON ANTI-VIBRATION MATERIALS AND SYMMETRICAL GANTRY STRUCTURE

Outstanding productivity and cutting accuracy are delivered with 42,000 rpm spindles, linear motors, and direct-drive motors.

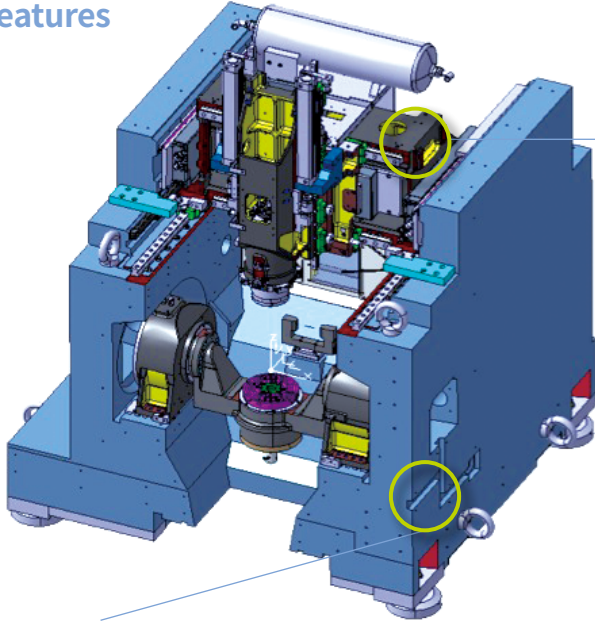
HEIDENHAIN CONTROLLER FOR MAXIMUM RELIABILITY

The adoption of Heidenhain controllers optimized for high-speed processing enhances machine reliability, visibility, and display applicability.

BASIC STRUCTURE

Stable cutting based on symmetrical gantry structure and antivibration materials (mineral casting).

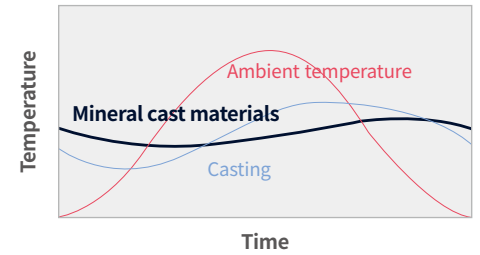
Structural and material features



Gantry structure

Horizontally-symmetrical structure suitable for high-speed, high-precision machining
Guaranteed structural stability

Built with a mineral cast bed for stable performance

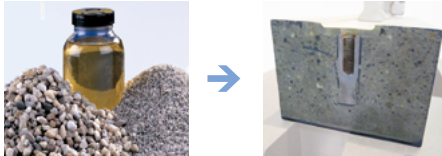


Normal cast materials

Mineral cast materials

↑ **25 times**
Thermal stability
25 times greater

Built with a mineral cast bed for stable performance



AXIS SYSTEM

The linear axes and rotary axes deliver high speed and superior accuracy.

Rotary axes equipped with direct drive motors*

The rotary table is equipped with a direct drive motor for rapid rotation coupled with rapid acceleration and deceleration. Thermal error is minimized by the water cooling system.

| Description | Unit | FM 200/5AX |
|---------------|---------|-----------------|
| Rapid | A/C | r/min 100 / 200 |
| Travel | | deg 140 / 360 |
| Load Capacity | kg (lb) | 15 (33.1) |

* For 5 axes only.

Linear Axes Equipped with Linear Motors

The X / Y / Z linear axes are driven by linear motors to realize high speed and accuracy, as well as superior positioning and repeatability.

| Description | Unit | FM 200/5AX |
|---------------------|-------|--|
| Rapid | X/Y/Z | m/min (ipm) 50 / 50 / 50 (1968.5 / 1968.5 / 1968.5) |
| Acc. / Deceleration | | m/sec ² 14.7 / 14.7 / 14.7 [1.5G / 1.5G / 1.5G] |

Up to **2G**



SPINDLE

One of the highest-speed spindles in its class, the ultra-high-speed enhances productivity and machining accuracy.

Ultra-high-speed spindle

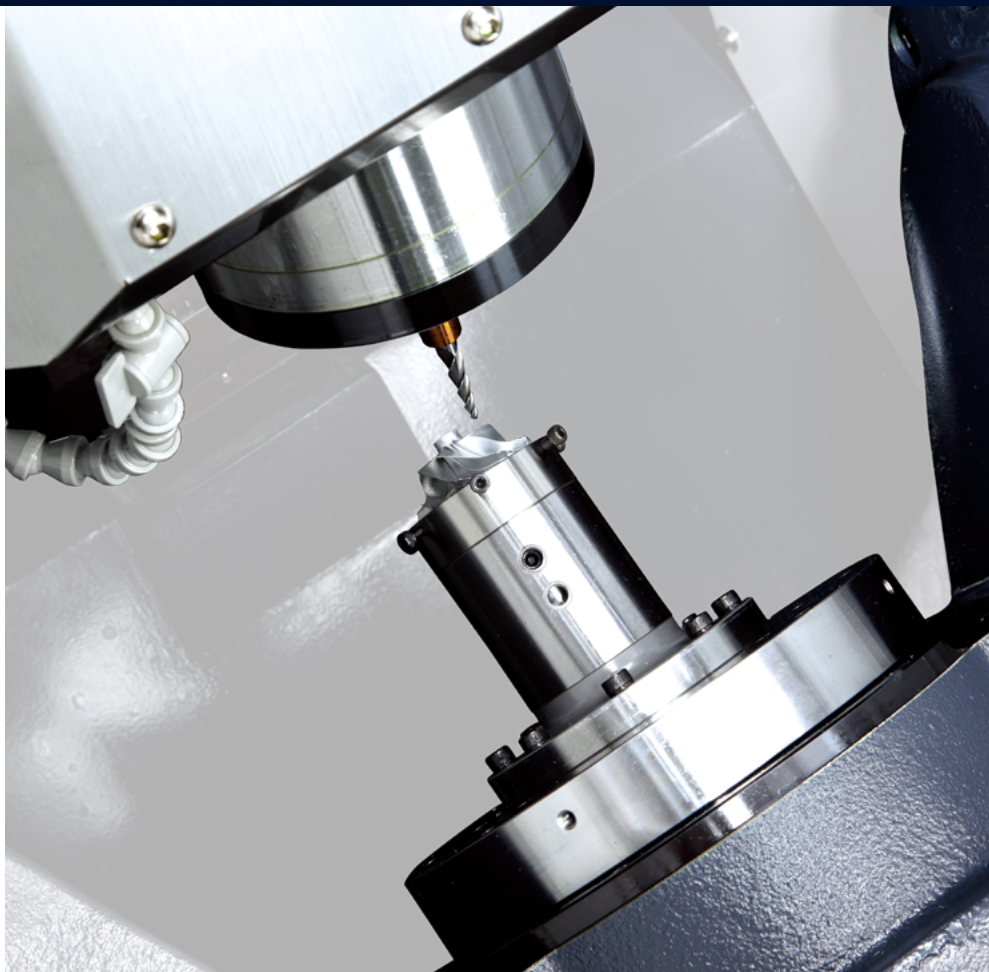
The spindle provides incomparably high productivity and machining accuracy.

Spindle speed (HSK-E40)

42000 r/min

Spindle motor

13.5 kW
13.4 Hp



MAGAZINE

The machine's structure has been simplified with the addition of a directdrive motor, while the operator's convenience has been enhanced by manual magazine operation for tool storage.

* FM 200/5AX model.
No of tool

24 ea

Max tool diameter

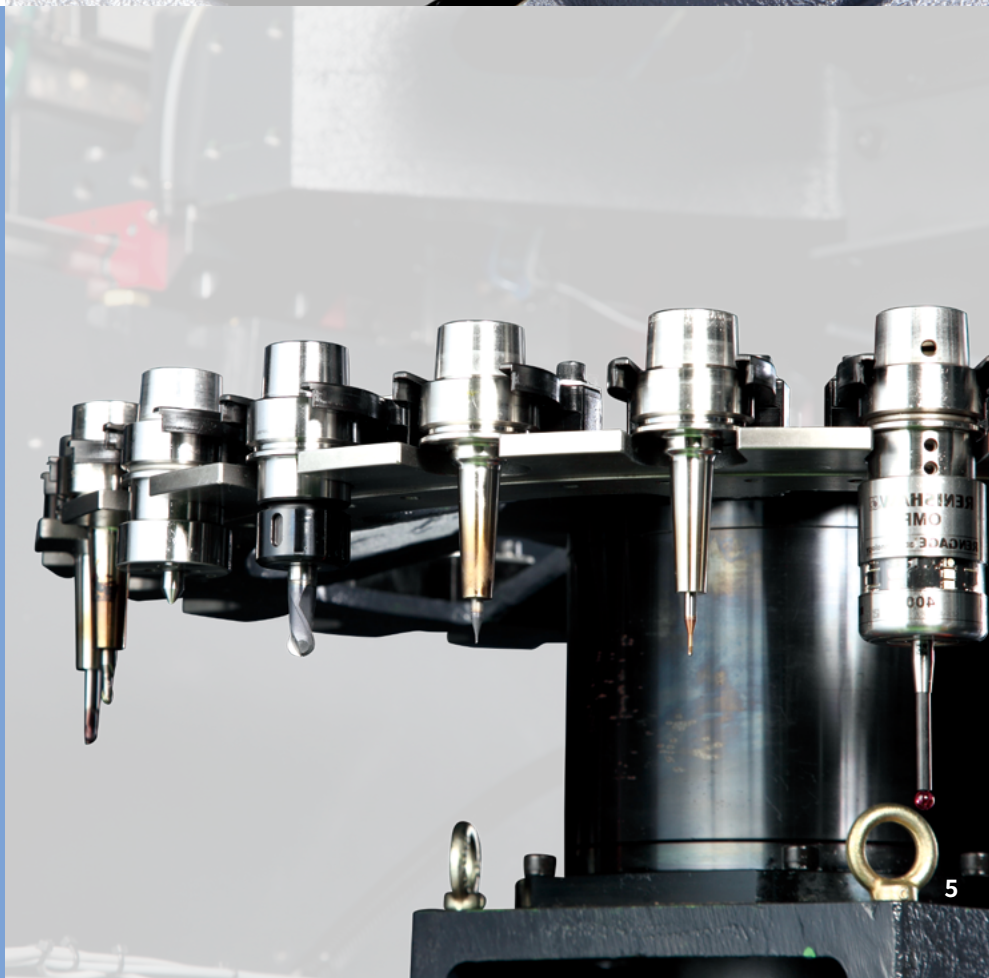
50 mm 2.0 inch

Max tool length

180 mm 7.1 inch

Tool change time

3.3 s



STANDARD | OPTIONAL SPECIFICATIONS

A range of options is available to suit individual requirements.

| Description | Features | FM 200/5AX |
|---------------------------------------|--|------------|
| Tool magazine | 24 tools | ● |
| | 40 tools | X |
| Tool shank type | HSK-E40 | ● |
| Auto door lock | | ● |
| Rotary table | Ø200 | ● |
| | Ø350 | X |
| Linear scale | X-axis | ● |
| | Y-axis | ● |
| | Z-axis | ● |
| Spindle | 42000 r/min | ● |
| | Spindle head cooling system | ● |
| | Thermal error compensation system | ● |
| Spindle motor power | 10 kW (HEIDENHAIN) | ● |
| Auto tool measuring device | NT-2_BLUM | ● |
| Auto work measuring device | OMP400_RENISHAW (W/Receiver) | ○ |
| | OMI-2C_RENISHAW (Receiver Only) | ○ |
| Master tool for auto tool measurement | CALIBRATION TOOL_BLUM (HSK E40) | ○ |
| Auto power cut-off | | ○ |
| Coolant | FLOOD (0.7kW_0.8MPa) | ● |
| | FLOOD (1.5 kW_0.69MPa) | X |
| | SHOWER | ○ |
| | Coolant level switch : Sensing level - Low / High ** | ○ |
| Chip bucket | | ○ |
| Chip conveyor | Chip pan | ● |
| | Hinged type | X |
| | Drum type | ○ |
| Table | 500 x 600 mm | X |
| Test bar | | ○ |
| AIR | AIR BLOWER | ● |
| MPG | Portable MPG | ● |
| MQL | | ○ |
| NC system | HEIDENHAIN iTNC530 | ● |
| OIL SKIMMER | BELT TYPE | ○ |
| | TUBE TYPE | X |

* Please contact DN Solutions to select detailed steady rest specifications

● Standard ● Optional X Not applicable



Fire Safety
Precautions

There is a high risk of fire when using non-water-soluble cutting fluids, processing flammable materials, neglecting the controlled and careful use of coolants and modifying the machine without the consent of the manufacturer. Always check the SAFETY GUIDELINES carefully before using the machine.

PERIPHERAL EQUIPMENT

Various solutions are available for better machining performance and higher-quality.

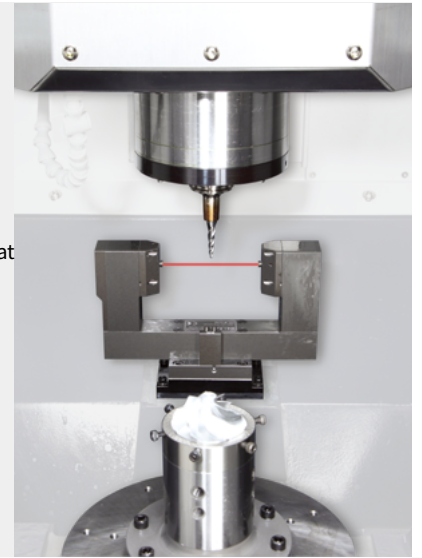
Convenient operation panel

The ergonomically-designed Heidenhain operation panel and 19-inch large screen enhance the operator's convenience.



Tool length measurement device

The standard tool length laser measuring device secures the highest degree of accuracy even at super-high-speed operation. (The touch probe is optional.)



Roller LMG

The roller-type LM Guideway has been adopted to ensure excellent rigidity and accuracy of the linear travel axes.



Linear scale (standard for all axes)

All axes are equipped with the linear scale as a standard feature to maintain the highest degree of accuracy over many hours of operation.



Gantry loader OPTION

Information on detailed specifications required prior to ordering.



OMP 400 OPTION

FM 200/5AX implementation



Recommendations for machine operation

Unlike ball-screw-type machines, a water chiller is used to cool down the linear motors and direct-drive motors. As such, the machine is sensitive to the control temperature of the chiller. Since the water chiller is controlled according to the ambient temperature, machine accuracy can be maintained and guaranteed in a constant temperature environment.

- Recommended operating conditions: Ambient temperature: $20 \pm 1.5^\circ\text{C}$, Temperature change: 0.4°C/hr or less, $\pm 1.5^\circ\text{C/24hr}$, Relative humidity: 20~80%

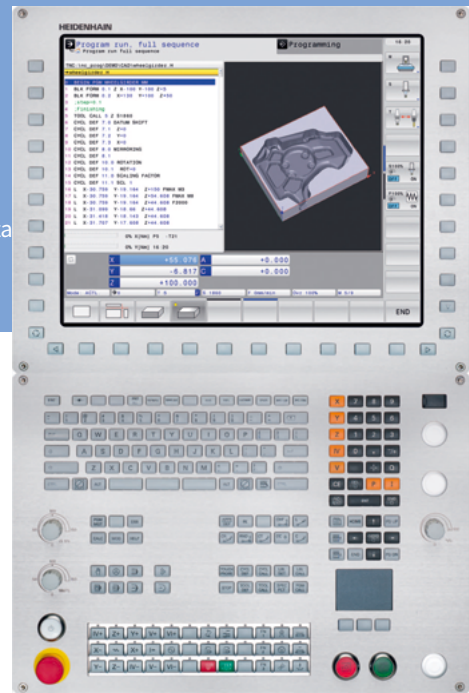
CONVENIENT OPERATION

HEIDENHAIN TNC640

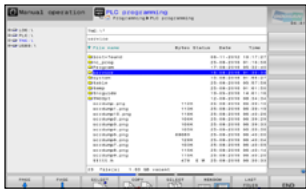
Superior hardware specifications

The TNC 640 features optimized motion control, short block processing times and special control strategies. Together with its uniform digital design and its integrated digital drive control (including inverters), it enables you to achieve high machining speeds and the best possible contour accuracy.

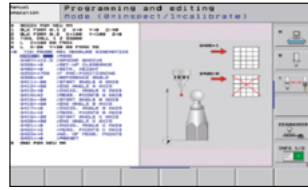
- 15.6" display
- 21GB Storage memory
- 1024 look ahead blocks
- High user convenience with folder structure data management



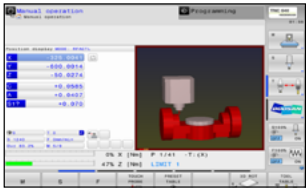
Conversational convenient function



Data are controlled in the folder structure; convenient communication via USB devices



KinematicOpt & KinematicCo^{option}
(Touch probe cycle for automatic measurement)



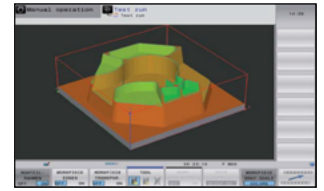
Collision protection system^{option}



Adaptive feed control^{option}



Various built-in pattern cycles for a wider scope of application (Software standard)



Graphic simulation

NUMERIC CONTROL SPECIFICATIONS



HEIDENHAIN

| Item | Specifications | FM200 |
|---|--|---------------|
| | | TNC640 |
| Controlled axes | | 5 (X,Y,Z,C,A) |
| Simultaneously controlled axes | | 5 axes |
| USB memory input/output | | ● |
| Embedded Ethernet | | ● |
| Look-ahead | 5000 Blocks | ● |
| KinematicsOpt | Automatic measurement and optimization of machine kinematics | ● |
| Dynamic collision monitoring (DCM) | | ● |
| MTConnect | | * |
| Display unit | 15.1 inch TFT color flat panel | ○ |
| | 15.1 inch TFT color with Touch Panel | ○ |
| | 19 inch TFT color flat panel | ● |
| | 19 inch TFT color with Touch Panel | ○ |
| Part program storage size & Number of registerable programs | 21GB | ● |
| | 1.8GB | X |

● Standard ○ Optional X N/A * Available

POWER | TORQUE

HEIDENHAIN

Max. spindle speed : **4200** r/min

Max. power : **13.5** kW
18.1 Hp

Max Torque : **8.8** N·m
6.5 ft-lbs

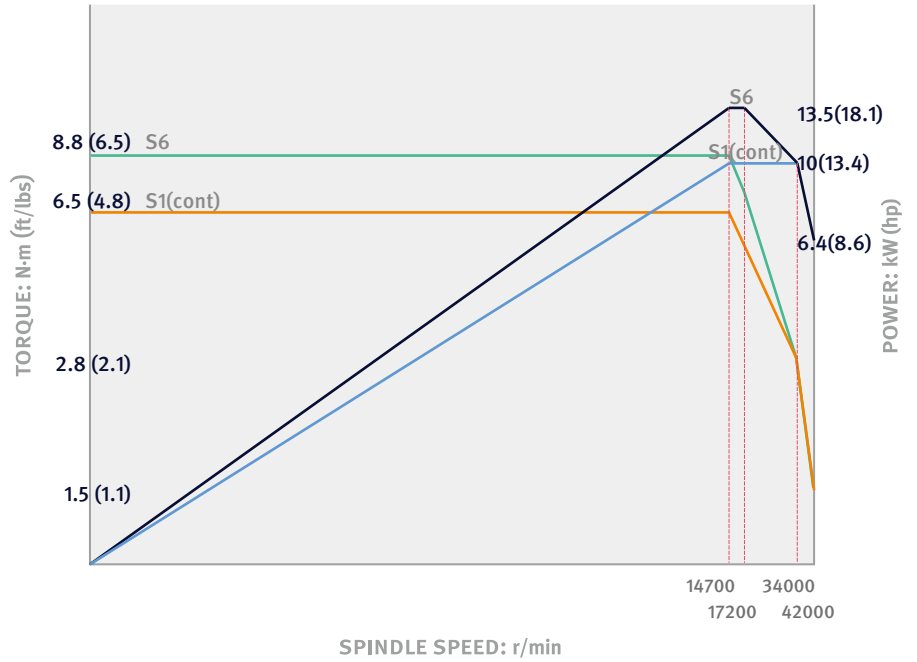
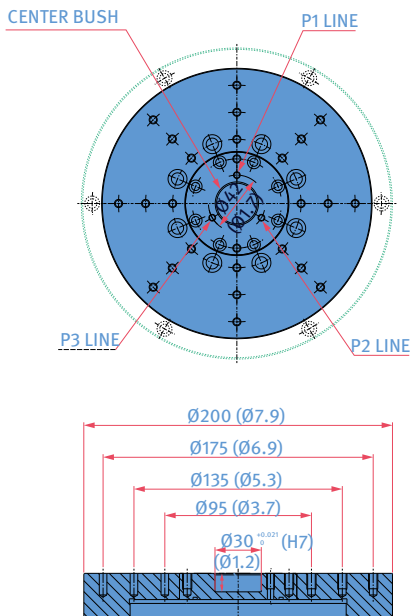
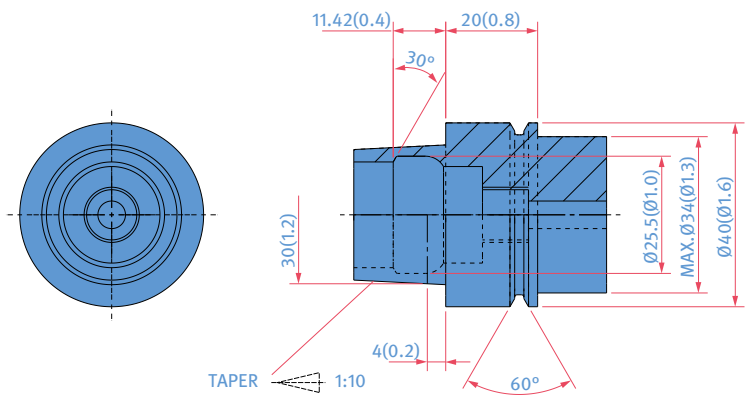


TABLE DIMENSIONS | TOOL SHANK

Table dimensions



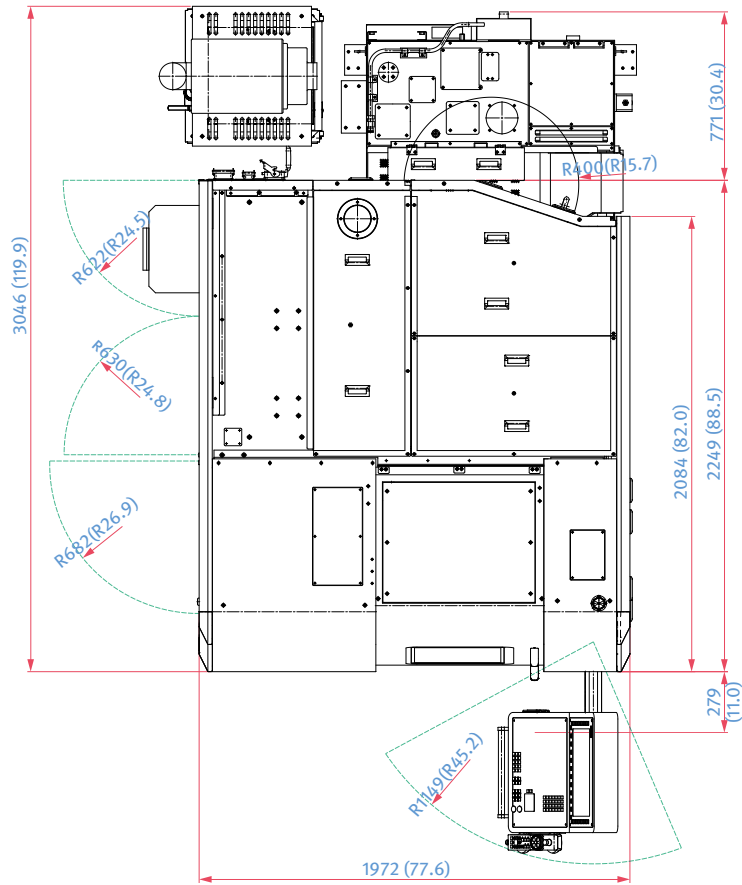
Tool shank (HSK-E40)



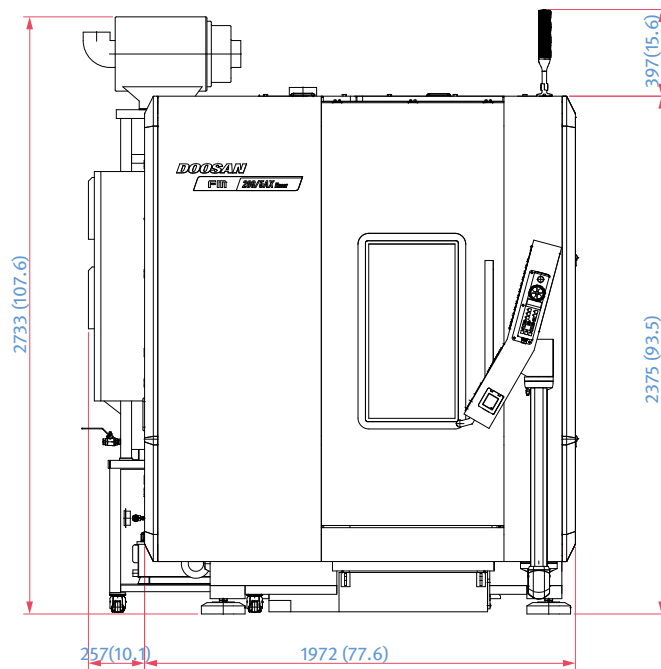
EXTERNAL DIMENSIONS

Unit: mm (inch)

TOP



FRONT



MACHINE SPECIFICATIONS

| Description | | Unit | FM 200/5AX | |
|------------------------|---|--------|---------------------|-----------------------|
| Travel | Travel distance | X-axis | mm (inch) | 200 (7.9) |
| | | Y-axis | mm (inch) | 340 (13.4) |
| | | Z-axis | mm (inch) | 300 (11.8) |
| | | A-axis | deg | 140 (-10 ~ +130) |
| | | C-axis | deg | 360 |
| | Distance from spindle center to table top | | mm (inch) | 110~410 (4.3~16.1) |
| | Distance from spindle center to column | | mm (inch) | 230 (9.1) |
| Feed rate | Rapid traverse rate | X-axis | m/min (ipm) | 50 (1968.5) |
| | | Y-axis | m/min (ipm) | 50 (1968.5) |
| | | Z-axis | m/min (ipm) | 50 (1968.5) |
| | | A-axis | r/min | 100 |
| | | C-axis | r/min | 200 |
| | Cutting feed rate | | m/min (ipm) | 20 (787.4) |
| Table | Table size | | mm (inch) | ∅ 200 (∅ 7.9) |
| | Loading capacity | | kg (lb) | 15 (33.1) |
| Spindle | Max. spindle speed | | r/min | 42000 |
| | Spindle taper | | - | HSK E40 |
| | Max. spindle torque | | N · m (ft-lb) | 6.5 (4.8) |
| Automatic tool changer | Tool shank type | | - | HSK E40 |
| | Tool storage capacity | | ea | 24 |
| | Max tool diameter | | mm (inch) | 50 (2.0) |
| | Max. tool length | | mm (inch) | 180 (2.9) |
| | Max. tool weight | | kg (lb) | 1 (2.2) |
| | Tool selection | | - | FIXED |
| | Tool change time (tool to tool) | | s | 3.9 |
| | Tool change time (chip to chip) | | s | 4.1 |
| Motor | Spindle motor power | | kW (Hp) | 10 (13.4) |
| | Coolant pump motor power | | kW (Hp) | 0.7 (0.9) |
| Power Source | Power consumption | | kVA | 66.4 |
| | Compressed air pressure | | MPa (psi) | 0.54 (78.3) |
| Tank Capacity | Coolant tank capacity | | L | 310 |
| | Lubricant tank capacity | | L | 5 |
| Tank Capacity | Height | | mm (inch) | 2375 (93.5) |
| | Length | | mm (inch) | 2249 (88.5) |
| | Width | | mm (inch) | 1972 (77.6) |
| | Weight | | kg (lb) | 7000 (275.6) |
| Controller | | - | HEIDENHAIN iTNC 640 | |

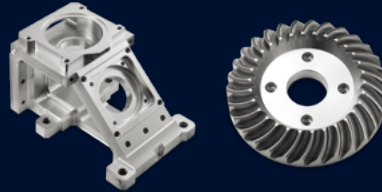
Recommended operating conditions : Ambient temperature: 20 ± 1.5°C
 Temperature change: < 0.4°C/h < ±1.5°C/24h
 Relative humidity: 20~80%

Cover All Possibilities

The powerful and versatile 5-axis machine lineup at DN Solutions is an unbeatable option for machine shops that want to enjoy limitless part-making possibilities.

DNM / 5AX series

The perfect entry into 5-axis machining. Compact, productive and built off the classic DNM architecture.



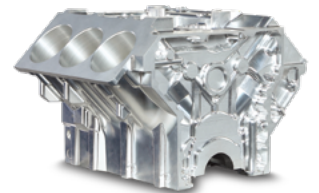
DVF series

With cutting-edge technology and an automation-ready framework, this machine elevates your 5-axis capability.



VCF 850SR/LSR

Our traveling column vertical machining center with a rotating B-axis spindle head and C-axis table is a fantastically flexible way to get more 5-axis production out of a single machine.



FM / 5AX series

Our ultra high speed and ultra precise linear motor series. 42000 r/min spindle speed with outstanding accuracy.



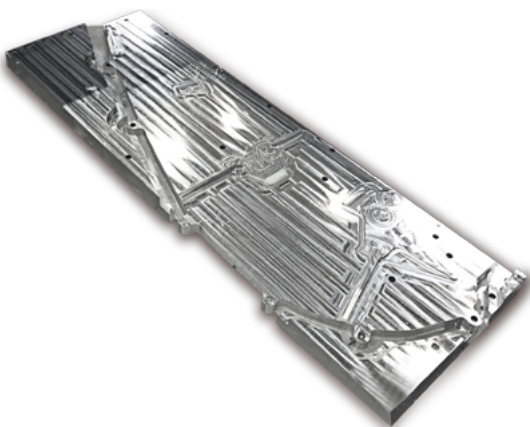
DHF series

A powerful twin-pallet machine for larger, complex parts. Handle those big parts with maximum efficiency.



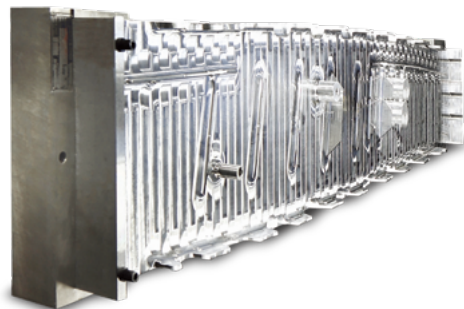
BM U series

An accurate and rigid bridge mill VMC. Capably handles the biggest parts for the biggest industries—aerospace, construction, oil/gas and more.



HFP series

A 5-axis super high performance machine for your larger aluminum structural components with 5 kW, 30000 r/min spindle.



The DN Solutions promise, MACHINE GREATNESS, has two important meanings. The first is simple: DN Solutions makes great machines. The second is a challenge to our end-users. With a product line that is this comprehensive, accurate and reliable, we equip our customers to machine greatness. The big question: ***Why should you choose DN Solutions over other options?***

Here's why...



**MACHINE
GREATNESS™**



WHAT YOU MAKE AND HOW YOU MAKE IT MATTERS—SO MAKE IT
GREAT WITH DN SOLUTIONS.

UNBEATABLE MACHINES

You won't find a more comprehensive range or a better combination of value, performance and reliability anywhere else.

ROBUST PRODUCT LINE

We offer an impressive range of machine models and hundreds of configurations. Whatever your machining needs and requirements, there's a DN Solutions for you.

READILY AVAILABLE - ANYWHERE IN THE WORLD

Machining centres (including 5-axis machines), lathes, multi-tasking turning centres and mill-turn machines, and horizontal borers with best-in-class specifications are all available...ready to install.

EXPERT SERVICE

Our dedicated, experienced and knowledgeable team is totally committed to improving your productivity, growth and success.

RESPONDING TO CUSTOMERS ANYTIME, ANYWHERE

DN Solutions Global Network

DN Solutions provides systems-based professional support services, before and after the machine tool sale, by responding quickly and efficiently to customers. By supplying spare parts, product training, field service and technical support, we provide the expert care, attention and assistance our customers expect from a market leader.

| | | | |
|--|-----------------|------------|---|
| Global sales and service support network | | 51 | Technical centers Technical center, Sales support, Service support, Parts support |
| 4 | Corporations | 200 | Service posts |
| 156 | Dealer networks | 3 | Factories |



CUSTOMER SUPPORT AND SERVICES

We're there for you whenever you need us.

We help our customers operate at maximum efficiency by providing them with a range of tried, tested and trusted services - from pre-sales consultancy to post-sales support.



Field services

- On-site service
- Machine installation and testing
- Scheduled preventive maintenance
- Machine repair service



Parts supply

- Supplying a wide range of original DN Solutions spare parts
- Parts repair service



Training

- Programming, machine setup and operation
- Electrical and mechanical maintenance
- Applications engineering



Technical support

- Supports machining methods and technology
- Responds to technical queries
- Provides technical consultancy



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* For more details, please contact DN Solutions.

* Specifications and information contained within this catalogue may be changed without prior notice.